Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Amendment of Part 90 of the Commission's	)	
Rules and Policies for Applications and	)	WT Docket No. 01-146
Licensing of Low Power Operations in	)	RM-9966
the Private Land Mobile Radio 450-470 MHz	)	
Band	)	

REPLY COMMENTS OF HEXAGRAM, INC.

Larry Sears
Director of Technology
Hexagram, Inc.
23905 Mercantile
Cleveland OH 44122
216-464-1057

November 13, 2001

Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Amendment of Part 90 of the Commission's	)	
Rules and Policies for Applications and	)	WT Docket No. 01-146
Licensing of Low Power Operations in	)	RM-9966
the Private Land Mobile Radio 450-470 MHz	)	
Band	)	

REPLY COMMENTS OF HEXAGRAM, INC.

Hexagram, Inc. hereby submits these Reply Comments in response to the Commission's Notice in the above-captioned proceeding.[1]

In its first-round Comments, Hexagram set out and justified the following positions:

> ***Group A***: We opposed raising power limits to 20 watts ERP within 50 miles of the top 100 urban areas, and 500 watts ERP elsewhere, on the ground that a power increase would limit frequency reuse and hence reduce the number of available frequencies. Moreover, we pointed out that high-power operation outside the urban boundary could threaten interference to operations inside the boundary.
>
> ***Group B***: We supported a duty cycle limitation, again to maximize frequency reuse and promote spectrum efficiency.
>
> ***Group C***: We supported non-coordinated, itinerant use so long as incumbent licensees are protected.
>
> ***Group D***: We supported co-channel sharing with central station alarm applications.

As a general matter, Hexagram shares other parties' concern over the strong tilt in the Notice toward voice operations at the expense of data. By far the lion's share of low-power channels -- the 75 pairs in Groups A and C -- are allocated to voice on a primary basis. The

---

[1] *Applications and Licensing of Low Power Operations in the Private Land Mobile Radio 450-470 MHz Band*, WT Docket No. 01-146, Notice of Proposed Rule Making, FCC 01-199 (released July 24, 2001) (Notice).

Commission is even considering barring secondary data from Groups A and C, and permitting voice on the larger of the remaining groups, Group B.[2]

The emphasis on voice is short-sighted. The past 15 years or so have seen an accelerating migration from voice to non-voice communications, through both the expansion of pure data applications and the digitization of voice communications. This growth will only continue, given the opportunity. The Commission should welcome it, because digital communications use spectrum more efficiently than conventional analog voice.[3] Indeed, over time, we expect market forces will result in data largely displacing voice. The Commission should not impose rules that impede this process.

A. ISSUES RELATING TO GROUP A CHANNELS

1. *The Commission should not increase power on Group A frequencies.*

The Commission proposed to raise power limits to 20 watts ERP within 50 miles of the top 100 urban areas, and 500 watts ERP elsewhere.[4]

Most parties that support raising the power limit do so to favor their own particular applications. The Toro Company, for example, which manufactures equipment for maintaining golf courses, argues that higher powers are needed to provide reliable coverage over the relatively large area a golf course occupies.[5] Toro prefers not to migrate to channels long

---

2 Notice at paras. 18, 20, 24.

3 *See* Comments of the United Telecom Council at 6, 8 (filed Oct. 12, 2001)

4 Notice at paras. 13-18.

5 Comments of the Toro Company at 3 (filed Oct. 12, 2001).

identified for high-power use, because equipment already deployed in the field operates on Group A frequencies.

Toro's filing is only one example, but it aptly illustrates the inequity of raising Group A powers at this time, after Hexagram and others have accepted the Commission's invitation to rely on them for low-power applications. As explained in our Comments, Hexagram has installed nearly three million devices for collecting and reporting data from utility meters throughout the nation. Nearly 300,000 of those use a fixed RF network subject to Part 90 low power rules, under more than 400 licenses issued to Hexagram and its customers. All of these are located on utility customers' premises, typically in the basements of private homes and businesses. Relocating them to a different frequency is simply not practicable. If Toro's customers need more than the 2 watts now permitted on low-power channels, they should have licensed a full-power channel from the start, rather than seek to change the low-power rules after the fact. If necessary, the relatively few units needed for communications over a golf course can be relocated to a different band far more easily than a meter-reading system that includes tens of thousands of units, most of them inaccessible.

Other parties agree with Hexagram that increasing the power limits on low-power channels will impede reuse and harm spectrum efficiency. Trimble Navigation Limited argues that higher powers would "severely limit frequency reuse in the Group A channels."[6] Similarly, the American Petroleum Institute favors keeping the present limits in part because doing so

---

[6] Comments of Trimble Navigation Limited at 6 (filed Oct. 12, 2001). Unlike Hexagram, Trimble would allow up to 100 watts outside the major urban areas.

"promotes greater frequency reuse and efficient spectrum management."[7] API also agrees with Hexagram that high-power operation close to the boundary defining a major urban area will threaten interference to protected low-power operations within the urban area.[8]

A very large number of full-power channels are allocated for those who need them, but only a few dozen are specifically allocated to low power. The Commission should leave their power limits unchanged.

2. Non-voice operations should continue to be permitted on Group A.

The Notice asks whether non-voice operations should be permitted on Group A frequencies.[9] The answer must be yes.

Dataradio correctly notes the considerable demand for data communications on these frequencies, as evidenced by the large number of non-voice applications currently licensed.[10] To meet this growing need for data capacity, and also to exploit the benefits of higher spectrum efficiency in digital communications, the Commission should continue to permit non-voice communications on Group A. Other parties agree.[11]

---

[7] Comments of the American Petroleum Institute at 4 (filed Oct. 12, 2001).

[8] *Id*. at 8-9.

[9] Notice at para. 18.

[10] Comments of Dataradio COR, Ltd. at 4-5 (filed Oct. 12, 2001).

[11] Comments of AES Corporation at 3-4 (filed Oct. 12, 2001); United Telecom Council at 6-7; Comments of the American Water Works Ass'n at 4 (filed Oct. 12, 2001).

3. If the Commission permits higher powers outside urban areas, it should define "urban area" expansively and require automatic power control.

The Commission proposed allowing full-power operation on low-power channels outside the top 100 urban areas.[12] Hexagram opposes that proposal. If the Commission adopts the proposal nonetheless, it should reserve low power operation in *at least* 100 urban areas, using the Metropolitan Statistical Area (MSA) definitions to identify boundaries.[13] If the Commission does not use MSAs for this purpose, it should name the urban areas in the rules and specify their center coordinates, and establish a radius around each of at least 75 miles.[14] In addition, the Commission should minimize interference by requiring automatic power control (APC) for all non-low-power operations on Group A frequencies.[15]

B. ISSUES RELATING TO GROUP B CHANNELS

1. The Commission should restrict Group B channels to data communications only.

The Notice asks whether Group B channels should be restricted to "data only."[16] The answer is yes.

Other things being equal, voice interferes with data much more than data interferes with voice. A channel shared between voice and data therefore puts the data primarily at risk.

---

[12] Notice at paras. 13-18.

[13] Comments of Hexagram, Inc, at 7 (filed Oct. 12, 2001).

[14] *See* American Petroleum Institute at 7.

[15] *See* Notice at para. 15.

[16] Notice at para. 20.

Dataradio points out the need for a "safe harbor" for mission critical data communications.[17] The least disruptive way to establish such a safe harbor is by designating the Group B channels for data communications only. Other parties agree.[18]

2. The Commission should impose a duty cycle limitation on Group B channels.

The Notice pointed out that continuous transmissions on the Group B channels would limit their availability for use by others, and asked whether the Commission should impose a limitation on duty cycle to promote efficient operation.[19] Hexagram's Comments agreed that such a limitation is in the public interest.[20] Other parties concur.[21] The ten channel pairs in Group B -- the only low-power channels allocated primarily for data communications -- will fall well short of meeting the Nation's fast-growing needs. If the Commission cannot allocate additional spectrum for this use, it should at least maximize access to the limited Group B resource by limiting duty cycle.

A few parties favor allowing continuous transmissions, but none offers any public interest consideration to offset the loss of frequency reuse.[22] The Toro Company opposes a duty cycle on

---

[17] Dataradio at 9-10.

[18] Trimble at 3-4; AES Corporation at 4-5; American Water Works Ass'n at 4.

[19] Notice at para. 19.

[20] Hexagram at 9.

[21] American Petroleum Institute at 10-11; United Telecom Council at 7-8; AES Corporation at 6.

[22] Trimble Navigation Limited at 4; Personal Communications Industry Ass'n at 4.

the ground that the length of its customers' transmissions are unpredictable.[23] A duty cycle limit, however, need only regulate *average* percentage of channel occupancy over some period of time, and so would readily accommodate even relatively long transmissions when needed. Most applications use far less than the full channel capacity, and could be designed to accommodate a reasonable duty cycle limit.

C. ISSUES RELATING TO GROUP C CHANNELS

1. The commission should protect existing low-power operations on Group C channels.

Hexagram does not oppose the Commission's proposal to permit non-coordinated, itinerant use on the Group C channels. Several parties also support itinerant use. As noted in Hexagram's first-round comments, however, the Commission should make sure this use does not cause interference to incumbent low-power users. Hexagram (and many others) constructed large systems in reliance on the then-unquestioned principle that operation on these channels would be coordinated and licensed. Any change in that rule must protect the existing users.

The Notice asks whether data transmission and fixed operations should be prohibited on Group C frequencies.[24] For the same reasons set out above in the discussion of voice vs. data above, Hexagram urges the Commission to continue permitting data operations in Group C. Other parties agree.[25] Itinerant data operations should be restricted to low duty cycles, however, to keep interference to a minimum.

---

[23] Toro Company at 7.

[24] Notice at para. 24.

[25] Comments of Pacific Crest Corporation at 4 (filed Oct. 12, 2001); Trimble at 6-7.

2. Group C radios should be restricted to group C channels.

Hexagram agrees with the tentative conclusion in the Notice that Group C radios be constructed so as to operate only on Group C and color-dot frequencies.[26] This measure is necessary to minimize unauthorized use of these radios on coordinated channels.[27]

CONCLUSION

The relatively few channels available exclusively for low-power operations are used for a variety of socially valuable services. They tend to use spectrum efficiently, because low-power operations permit a high level of frequency reuse. To maintain these advantages, the Commission should not increase the power on the Group A channels, should impose a duty cycle limitation on Group B, and should protect incumbent Group C applications against newly itinerant users. Data communications should be allowed in Groups A and C; and *only* data communications should be allowed in Group B. The Commission should impose a duty cycle requirement, and other measures discussed above, to provide reasonably spectrum efficiency.

Respectfully submitted,

/s/
Larry Sears
Director of Technology
Hexagram, Inc.
23905 Mercantile
Cleveland OH 44122
216-464-1057

November 13, 2001

---

[26] Notice at para. 25.

[27] *See* United Telecom Council at 4.

SERVICE LIST

Chairman Michael Powell
Federal Communications Commission
Washington, D.C. 20554

Commissioner Kathleen Q. Abernathy
Federal Communications Commission
Washington, D.C. 20554

Commissioner Michael J. Copps
Federal Communications Commission
Washington, D.C. 20554

Commissioner Kevin J. Martin
Federal Communications Commission
Washington, D.C. 20554

Thomas J. Sugrue, Chief
Wireless Telecommunications Bureau
Federal Communications Commission
Washington, D.C. 20554

D'wana Terry, Chief
Public Safety and Private Wireless Division
Wireless Telecommunications Bureau
Federal Communications Commission
Washington, D.C. 20554

John Schauble, Chief
Policy and Rules Branch
Public Safety and Private Wireless Division
Wireless Telecommunications Bureau
Federal Communications Commission
Washington, D.C. 20554

Guy Benson
Policy and Rules Branch
Public Safety and Private Wireless Division
Wireless Telecommunications Bureau
Federal Communications Commission
Washington, D.C. 20554